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Missouri Solid Waste Reduction
Status Report
For Calendar Year - 1999

Solid Waste Management Program
Planning and Administrative Support Section

STATEMENT OF THE ISSUE:

Senate Bill 530 established a statewide solid waste diversion goal of 40%. Since 1990, the Department of Natural Resources has been collecting waste data in order to assess progress in Missouri's waste diversion efforts. The most challenging aspect of determining waste diversion estimates continues to be the accurate assessment of the amount of waste generated. The House Interim Committee on Solid Waste and Recycling recommended that the department develop a less conservative methodology to track waste generation in addition to the one currently used. This year a new method for determining waste generation has been initiated. Resulting waste diversion rates using the new generation methodology are compared with the traditional tracking method.

FIXED GENERATION RATE METHODOLOGY:

The tracking method used prior to this report established 1990 as the base year for measurement of diversion rates. Based upon this information, a fixed annual per-capital generation rate (FGR) of 1.47 tons was established for 1990. That fixed variable has been multiplied by Missouri's estimated population for any given year to render a total waste generation figure. Census projections from the Office of Administration, Division of Budget and Planning, are used to determine the yearly population estimates.

Using the FGR methodology, the estimated waste generation for calendar year 1999 is approximately 8,038,457 tons. The total amount of waste disposed by Missouri in 1999 is estimated to be 6,146,911 tons. The difference between the generation rate and the disposal rate, 1,891,546 tons, is the estimated amount of waste that is diverted. This shows a reduction rate of 24% for 1999, down from 27% in 1998.

VARIABLE GENERATION RATE METHODOLOGY:

For some time, Missouri solid waste planners have seen indications that per capita waste generation appears to correlate with the relative state of the economy. This trend is now gaining acknowledgement in much of the solid waste community. In fact, the most recent report from the U.S. Environmental Protection Agency (EPA) regarding waste generation found that waste generation increases during boom times as consumers buy more goods, produce more packaging waste and toss out more worn-out products. While this phenomena makes sense intuitively, until recently, no calculation method existed in Missouri to factor in economic impacts. The Solid Waste Management Program has developed a new method for determining waste generation

which directly reflects the current state of the economy. The economic data used are the Personal Consumption Expenditures (PCE) for Missouri. The PCE figures are the amount of dollars that are spent by Missourians on durable goods, nondurable goods and services. The figures were provided by the Office of Administration's Division of Budget and Planning.

The variable generation rate (VGR) method also uses 1990 as the baseline year, wherein the estimated waste generated in 1990 is divided by the PCE for 1990 to derive an index by which subsequent years' PCE values may be multiplied. The VGR method therefore links the relative economic climate as indicated by personal expenditures to the quantity of waste generated for reuse, recycling or disposal by Missourians. The results of applying this methodology to existing and past data are consistent with the findings noted by the EPA.

DISCUSSION

Table 1 (page 3) compares waste generation and waste diversion using the two methodologies for calendar years 1990 through 1999. Figure 1 (page 5) compares the total tonnage of waste generated for the two methods. It should be noted that the total disposal tonnage is the same for both methods. The VGR method registers an increase in waste generation of nearly 16% over time as compared to the FGR method, Table 2 (page 4). This increase results in a daily per capita generation increase as well.

It is important to note that all the waste generation includes industrial and commercial waste along with municipal solid waste (MSW). MSW is composted primarily of waste generated in households, office buildings, restaurants and light commercial settings. The daily per capita generation rate and diversion rate for total waste as well as the MSW generation rate for the VGR method is shown on Figure 2 (page 6). MSW generation is determined by multiplying the total waste generation figure by the estimated percentage (59.6%) of MSW in the total waste stream *(Missouri Solid Waste Composition Study, MAP, 1999)

CONCLUSION

Since there are few finite elements in Missouri's waste management data, it is therefore necessary to consider multiple indexes in order to construct a reasonably accurate picture of Missouri's waste generation and diversion. The VGR method appears to be a closer representation of real-world waste generation than the more conservative FGR method. While the results of the VGR method are encouraging when considering waste diversion, they are also disturbing when considering the increase in the amount of waste being generated. This increase in waste infers an increased use of natural resources, both recovered and virgin.

Simply looking at the data it is easy to be complacent—using the VGR methodology we came within one percentage point of reaching our 40% goal in 1996, and we are still hovering around the 36% level today. We should consider ourselves successful, right? Perhaps not. We must not lose sight of the fact that while we are recycling more, we are also landfilling more. This can only occur because we are generating more waste. Improved awareness and sense of responsibility in all sectors is the best solution to stemming the tide of increased generation.

* Contact the Solid Waste Management Program at (573) 751-5401 for information regarding this study.

Calendar Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Population	5,117,073	5,157,507	5,193,872	5,237,867	5,281,280	5,226,784	5,358,692	5,402,058	5,438,559	5.468,338
Waste Generated in Missouri (Fixed Generation Method)	7,540,000	7,581,535	7,634,992	7,699,664	7,763,482	7,660,801	7,896,025	7,941,025	7,994,682	8,038,458
Waste Generated in Missouri (Variable Generation Method)	7,540,000	7,623,009	7,844,367	8,107,229	8,411,680	8,563,780	8,771,303	9,048,000	9,227,853	9,559,890
Solid Waste Disposed of in Missouri Landfills	5,400,000	5,269,846	4,751,816	4,731,633	4,075,174	4,121,753	3,640,337	4,118,739	4,464,357	4,570,496
Solid Waste Imported from Other States	Data Not Available	Data Not Available	Data Not Available	Data Not Available	Data Not Available	171,043	65,210	159,209	143,358	175,275
Total In-State Disposal	5,400,000	Data Not Available	Data Not Available	Data Not Available	Data Not Available	3,950,710	3,575,127	3,959,530	4,320,999	4,395,221
Solid Waste Exported By Missouri to other States	1,400,000	Data Not Available	Data Not Available	Data Not Available	Data Not Available	1,750,515	1,755,606	1,569,033	1,551,417	1,751,690
Solid Waste Disposed by Missouri	6,800,000	6,442,395	5,797,644	5,623,663	5,852,177	5,701,225	5,330,733	5,528,563	5,872,416	6,146,911
* Waste Diversion (Fixed Generation Method)	740,000	1,139,140	1,837,348	2,076,001	1,911,305	1,959,576	2,565,292	2,412,462	2,141,301	1,891,546
* Waste Diversion (Variable Generation Method)	740,000	1,180,614	2,046,723	2,483,566	2,559,503	2,862,555	3,440,570	3,519,437	3,355,437	3,412,979
Percent Waste Diversion (Fixed Generation Method)	10%	15%	24%	27%	25%	26%	33%	30%	27%	24%
Percent Waste Diversion (Variable Generation Method)	10%	15%	26%	31%	30%	33%	39%	39%	36%	36%

***** Waste Diversion includes waste reduction, reuse, recycling and composting

Table 1

	Waste Generation (Tons)			Waste Diversion (Tons)		
	Fixed (FGR) Methodology	**Variable (VGR) Methodology**	**Percent Change Between Methods**	**Fixed (FGR) Methodology**	**Variable (VGR) Methodology**	**Percent Change Between Methods**
1990	7,540,000	7,540,000	0	740,000	740,000	0
1991	7,581,535	7,623,009	0.5%	1,139,140	1,180,614	3.5%
1992	7,634,992	7,844,367	2.7%	1,837,348	2,046,723	10.2%
1993	7,699,664	8,107,229	5.0%	2,076,001	2,483,566	16.4%
1994	7,763,482	8,411,680	7.7%	1,911,305	2,559,503	25.3%
1995	7,683,372	8,563,780	10.3%	1,982,147	2,862,555	30.8%
1996	7,877,277	8,771,303	10.2%	2,546,544	3,440,570	26.0%
1997	7,941,025	9,048,000	12.2%	2,412,462	3,519,437	31.5%
1998	7,994,682	9,227,853	13.4%	2,122,266	3,355,437	36.8%
1999	8,038,457	9,559,890	15.9%	1,891,546	3,412,979	44.6%

Table 2

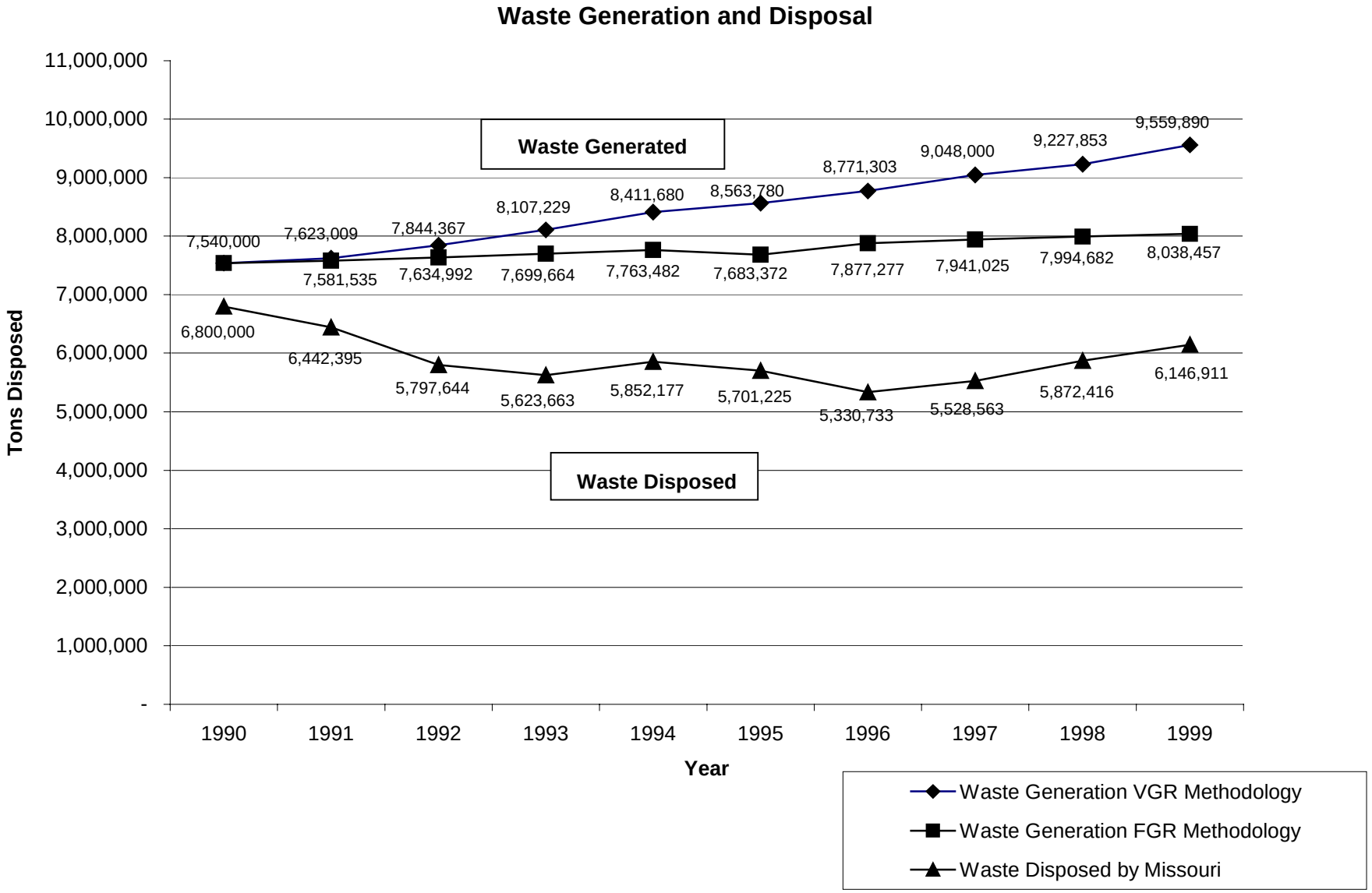
Waste Generation and Disposal
Tons Disposed
11,000,000
10,000,000
9,000,000
8,000,000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
-
Waste Generated
Waste Disposed
7,540,000
7,623,009
7,844,367
8,107,229
8,411,680
8,563,780
8,771,303
9,048,000
9,227,853
9,559,890
7,581,535
7,634,992
7,699,664
7,763,482
7,683,372
7,877,277
7,941,025
7,994,682
8,038,457
6,800,000
6,442,395
5,797,644
5,623,663
5,852,177
5,701,225
5,330,733
5,528,563
5,872,416
6,146,911
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
Year
Waste Generation VGR Methodology
Waste Generation FGR Methodology
Waste Disposed by Missouri

Figure 1

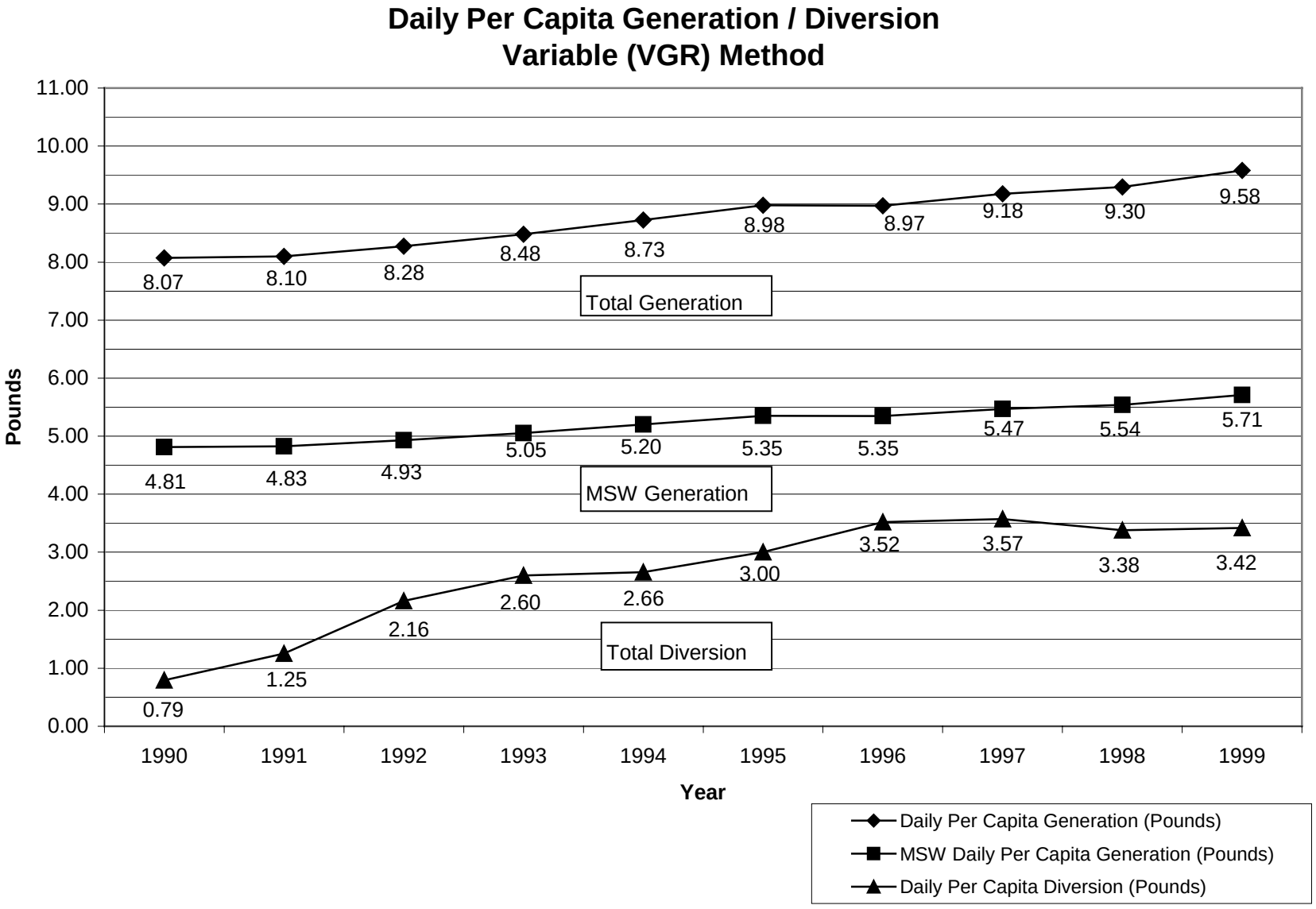
Daily Per Capita Generation / Diversion
Variable (VGR) Method
Pounds
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
8.07
8.10
8.28
8.48
8.73
8.98
8.97
9.18
9.30
9.58
Total Generation
4.81
4.83
4.93
5.05
5.20
5.35
5.35
5.47
5.54
5.71
MSW Generation
0.79
1.25
2.16
2.60
2.66
3.00
3.52
3.57
3.38
3.42
Total Diversion
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
Year
Daily Per Capita Generation (Pounds)
MSW Daily Per Capita Generation (Pounds)
Daily Per Capita Diversion (Pounds)

Figure 2